A METHOD FOR MARKING AQUATIC INSECT LARVAE (NOTE)

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ABSTRACT

A coloured plastic ring composed of "perspex" (methyl methacrylate) and coloured fluorescent powder is formed by precipitation around a leg segment of an aquatic insect. The mark is long-lasting and is especially suitable for fragile aquatic larvae.

INTRODUCTION

As part of a study on Zygoptera larval behaviour, it became necessary to mark individuals. The methods described by Moore (1960) proved impracticable because of the small size and fragility of the larvae being used. Brusven (1970) proposed sprinkling specimens with fluorescent powder, relying on mechanical adherence, but this failed to provide adequate coding and was unsatisfactory because the larvae remained marked for less than a week.

A biologically inert glue (Selley's Instant Grip, Selley's Chemicals, Auckland) sprinkled with fluorescent powder, was tried, but the high viscosity of the rapidly drying glue resulted in long strings of semi-dried material joining the animal to the marking instrument. An earlier experience with glueing "perspex" (methyl methacrylate) had shown that dissolved methacrylate could be used at a low viscosity (J.S. Elder pers. comm.); this was the basis for my successful technique.

METHOD

A solution of 1 part by volume of "Tensol 6", a commercial methacrylate glue produced by ICI, to 3 parts by volume of chloroform was made up, and 1 part by volume of coloured fluorescent powder (one of Sterling S100 yellow, S100 red, S150 blue,

Sterling Colour Co., London) was added. Whereas a glue was used as the base on this occasion, methacrylate chips dissolved in chloroform would be a successful substitute. Chloroform was chosen as the solvent because of its rapid evaporation, low toxicity and ready availability. Before use, the stock solution was further diluted with chloroform to a watery consistency so that only a thin layer adhered to the entomological pin being used to mark the animals.

Animals to be marked were placed on a sheet of blotting paper to remove droplets of surface water; then the pin with the marking fluid was applied rapidly against both sides of the leg segment being marked. If necessary the colour was intensified by a further application of fresh marking fluid to the ring now formed. After marking the larvae were kept in air for thirty seconds, then the animals were returned to the water and the remaining chloroform allowed to leach from the ring. After marking the limb involved became anaesthetised and inoperative but after a few hours limb action usually returned to normal. Behaviour seemed unaffected. Each animal took less than one minute to mark; and, by using colour codes and sequential marking, large numbers of specimens can be made individually recognisable.

The method has been used to mark either the femur or the tibia of the final three instars of *Xanthocnemis zealandica* (McLachlan) (Odonata: Coenagrionidae), *Austrolestes colensonis* (White) (Odonata: Lestidae) and a variety of instars of *Procordulia smithii* (White) (Odonata: Corduliidae). On unecdysed larvae the plastic rings remained in place for over three months, at which time emergence occurred.

The ring remains on the exuvia and the next instar is unmarked and apparently unaffected. The technique has also been successfully tested on mygalomorphs (Arachnida) and salticids (Arachnida).

Two problems have arisen with this technique. If the specimen is returned to the water before the plastic in the ring has precipitated, surface tension may cause the chloroform solution to form a ball; and these balls usually come off within a day or two. While not sticky in a conventional sense, the marking solution acts almost as a contact adhesive with methacrylate plastic (including rings on other animals); thus individuals need to be placed in separate containers until the chloroform has leached from the rings (about ten minutes).

This marking solution is not suitable for painting marks onto animals, because when the chloroform has leached out a methacrylate film is left which does not adhere to wax, chitin or other surfaces. The technique involves creating a ring of methacrylate film around a limb to band the individual larva; the band does not stick to the animal but is held in place mechanically.

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